

What is claimed is:

1. A catalytic antibody capable of degrading cocaine comprising a light chain wherein the amino acid sequence of complementarity determining region 1 is RSSXGTITXXNYAN (Seq ID No: 73), the amino acid sequence of complementarity determining region 2 is XNNYRPP (Seq ID No: 74) and the amino acid sequence of complementarity determining region 3 is ALWYSNHWV (Seq ID No: 75) and a heavy chain wherein the amino acid sequence of complementarity determining region 1 is DYNMY (Seq ID No: 76), the amino acid sequence of complementarity determining region 2 is YIDPXNGXXFYNQKFXG (Seq ID No: 78) and the amino acid sequence of complementarity determining region 3 is GGGLFAX (Seq ID No: 78).
2. The catalytic antibody of the claim 1, comprising a light chain wherein the amino acid sequence of complementarity determining region 1 is RSSTGTITSDNYAN (Seq ID No. 37), the amino acid sequence Complementarity determining region 2 is VMNYRPP (Seq ID No. 38) and the amino acid sequence Complementarity determining region 3 is ALWYSNHWV (Seq ID No. 39) and a heavy chain wherein the amino acid sequence of Complementarity determining region 1 is DYNMY (Seq ID No: 64), the amino acid sequence of Complementarity determining region 2 is YIDPSNGDTFYNQKFQG (Seq ID No: 65) and the amino acid sequence of Complementarity determining region 3 is GGGLFAF (Seq ID No: 66).
3. The catalytic antibody of claim 2, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:3 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 16.

4. The catalytic antibody of claim 1, comprising a light chain wherein the amino acid sequence of complementarity determining region 1 is RSSAGTITTSNYAN (Seq ID No. 34), the amino acid sequence of complementarity determining region 2 is VNNNRPP (Seq ID No. 35) and the amino acid sequence of complementarity determining region 3 is ALWYSNHWV (Seq ID No. 36) and a heavy chain wherein the amino acid sequence of complementarity determining region 1 is DYNMY (Seq ID No: 61), the amino acid sequence of Complementarity determining region 2 is YIDPHNGGIFYNQKFKG (Seq ID No. 63) and the amino acid sequence of Complementarity determining region 3 is GGGLFAY (Seq ID No: 63).
5. The catalytic antibody of claim 4, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:2 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 15.
6. The catalytic antibody of claim 1, comprising a light chain wherein the amino acid sequence of Complementarity determining region 1 is RSSTGTITTSNYAN (Seq ID No. 31), the amino acid sequence of Complementarity determining region 2 is INNNRPP (Seq ID No. 32) and the amino acid sequence of Complementarity determining region 3 is ALWYSNHWV (Seq ID No. 33) and a heavy chain wherein the amino acid sequence of the of Complementarity determining region 1 is DYNMY (Seq ID No: 58), the amino acid sequence of Complementarity determining region 2 is YIDPSNGGIFYNQKFKG (Seq ID No: 59) and the amino acid sequence of Complementarity determining region 3 is GGGLFAY (Seq ID No: 60).

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7. The catalytic antibody of claim 6, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:1 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 14.
8. A catalytic antibody capable of degrading cocaine comprising a light chain wherein the amino acid sequence of Complementarity determining region 1 is RSSSGTITANNYGS (Seq ID No: 40), the amino acid sequence of Complementarity determining region 2 is VSNNRGP (Seq ID No: 41) and the amino acid sequence of Complementarity determining region 3 is ALWNSNHFV (Seq ID No: 42) and a heavy chain wherein the amino acid sequence of Complementarity determining region 1 is TYYIY (Seq ID No: 67), the amino acid sequence of Complementarity determining region 2 is GMNPGNGVTYFNEKFKN (Seq ID No: 68) and the amino acid sequence of Complementarity determining region 3 is VGNLFAV (Seq ID No: 69).
9. The catalytic antibody of claim 8, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:4 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 18.
10. A catalytic antibody capable of degrading cocaine comprising a light chain wherein the amino acid sequence of Complementarity determining region 1 is RSSXSLLYXDGKTYLN (Seq ID No: 79), the amino acid sequence of Complementarity determining region 2 is LMSTRXS (Seq ID No: 80) and the amino acid sequence of Complementarity determining region 3 is QXFXXPFT (Seq ID No: 81) and a heavy chain wherein the amino acid sequence of Complementarity determining region 1 is SDYAWX (Seq ID No: 82), the amino acid sequence of Complementarity determining region 2 is YIRXXXTRYNPSLXS (Seq ID No: 83) and the amino acid

sequence of Complementarity determining region 3 is  
XHYYGXXX (Seq ID No: 84).

11. The catalytic antibody of claim 10, comprising a  
light chain wherein the amino acid sequence of  
Complementarity determining region 1 is  
RSSRSLLYRDGKTYLN (Seq ID No. 19), the amino acid  
sequence of Complementarity determining region 2 is  
LMSTRSS (Seq ID No. 20) and the amino acid sequence  
of Complementarity determining region 3 is QHFVDYPFT  
(Seq ID No. 21) and a heavy chain wherein the amino  
acid sequence of Complementarity determining region  
1 is SDYAWT (Seq ID No: 46), the amino acid sequence  
of Complementarity determining region 2 is  
YIRHIYGTRYNPSLIS (Seq ID No: 47) and the amino acid  
sequence of Complementarity determining region 3 is  
YHYYGSAY (Seq ID No: 48).
12. The catalytic antibody of claim 11, wherein the  
light chain comprises the amino acid sequence as set  
forth in Seq ID No:5 and the heavy chain comprises  
the amino acid sequence as set forth in Seq ID No:  
10.
13. The catalytic antibody of claim 10 comprising a  
light chain wherein the amino acid sequence of  
Complementarity determining region 1 is  
RSSKSLLYEDGKTYLN (Seq ID No. 22), the amino acid  
sequence of Complementarity determining region 2 is  
LMSTRAS (Seq ID No.. 23) and the amino acid sequence  
of Complementarity determining region 3 is QHFEDYPFT  
(Seq ID No. 24) and a heavy chain wherein the amino  
acid sequence of Complementarity determining region  
1 is SDYAWT (Seq ID No: 49), the amino acid sequence  
of Complementarity determining region 2 is  
YIRHIYGTRYNPSLIS (Seq ID No: 50) and the amino acid  
sequence of Complementarity determining region 3 is

YHYYGSAY (Seq ID No: 51).

14. The catalytic antibody of claim 13, wherein the  
light chain comprises the amino acid sequence as set  
forth in Seq ID No:6 and the heavy chain comprises  
the amino acid sequence as set forth in Seq ID No:  
11.
15. The catalytic antibody of claim 10, comprising a  
light chain wherein the amino acid sequence of  
Complementarity determining region 1 is  
RSSKSLLYEDGKTYLN (Seq ID No. 25), the amino acid  
sequence of complementarity determining region 2 is  
LMSTRAS (Seq ID No. 26) and the amino acid sequence  
of Complementarity determining region 3 is QQFVEYPFT  
(Seq ID No. 27) and a heavy chain wherein the amino  
acid sequence of complementarity determining region  
1 is SDYAWN (Seq ID No: 52), the amino acid sequence  
of complementarity determining region 2 is  
YIRYSGITRYNPSLKS (Seq ID No: 53) and the amino acid  
sequence of complementarity determining region 3 is  
IHYYGYGN (Seq ID No: 54).
16. The catalytic antibody of claim 15, wherein the  
light chain comprises the amino acid sequence as set  
forth in Seq ID No:8 and the heavy chain comprises  
the amino acid sequence as set forth in Seq ID No:  
13.
17. The catalytic antibody of claim 10, comprising a  
light chain wherein the amino acid sequence of  
Complementarity determining region 1 is  
RSSRSLLYRDGKTYLN (Seq ID No. 28), the amino acid  
sequence of complementarity determining region 2 is  
LMSTRAS (Seq ID No. 29) and the amino acid sequence  
of complementarity determining region 3 is QHFEDYPFT  
(Seq ID No. 30) and a heavy chain wherein the amino

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acid sequence of complementarity determining region 1 is SDYAWT (Seq ID No: 55), the amino acid sequence complementarity determining region 2 is YIRHIYGTRYNPSLIS (Seq ID No: 56) and the amino acid sequence complementarity determining region 3 is YHYYGSAY (Seq ID No: 57).

18. The catalytic antibody of claim 17, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:7 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 12.
19. A catalytic antibody capable of degrading cocaine comprising a light chain wherein the amino acid sequence of Complementarity determining region 1 is KSSQSLLYSDGKTYLN (Seq ID No: 43), the amino acid sequence of Complementarity determining region 2 is LVSKLDS (Seq ID No: 44) and the amino acid sequence of Complementarity determining region 3 is VQGYTFPLT (Seq ID No: 45) and a heavy chain wherein the amino acid sequence of Complementarity determining region 1 is DHWMH (Seq ID No: 72), the amino acid sequence of complementarity determining region 2 is TIDLSDTYTGYNQNFKG (Seq ID No: 71) and the amino acid sequence of complementarity determining region 3 is RGFDY (Seq ID No: 72).
20. The catalytic antibody of claim 19, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:9 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 17.
21. A polypeptide comprising a light chain domain with complementarity determining region 1 having amino acid sequence RSSXGTITXXNYAN (Seq ID No: 73),

complementarity determining region 2 having amino acid sequence XNNYRPP (Seq ID No: 74) and complementarity determining region 3 having amino acid sequence ALWYSNHWV (Seq ID No: 75), interposed between appropriate framework regions, said light chain domain being linked to a heavy chain domain with complementarity determining region 1 having amino acid sequence DYNMY (Seq ID No: 76), complementarity determining region 2 having amino acid sequence YIDPXNGXIFYNQKFXG (Seq ID No: 77) and complementarity determining region 3 having amino acid sequence GGGLFAX (Seq ID No: 78) interposed between appropriate framework regions such that said polypeptide assumes a conformation suitable for degrading cocaine.

22. The polypeptide of claim 21, wherein the amino acid sequence of the complementarity determining region 1 of the light chain is RSSTGTITSDNYAN (Seq ID No. 37), the amino acid sequence of the complementarity determining region 2 of the light chain is VNNYRPP (Seq ID No. 38) and the amino acid sequence of the complementarity determining region 3 of the light chain is ALWYSNHWV (Seq ID No. 39) and the corresponding amino acid sequence of the complementarity determining region 1 of the heavy chain is DYNMY (Seq ID No: 64), the amino acid sequence of complementarity determining region 2 of the heavy chain is YIDPSNGDIFYNQKFQG (Seq ID No: 65) and complementarity determining region 3 of the heavy chain is GGGLFAF (Seq ID No: 66).

23. The polypeptide of claim 22, wherein the light chain domain comprises the amino acid sequence as set forth in Seq ID No:3 and the heavy chain comprises

the amino acid sequence as set forth in Seq ID No: 16.

- 5 24. The polypeptide of claim 21, wherein the amino acid sequence of the complementarity determining region 1 of the light chain is RSSAGTITTSNYAN (Seq ID No. 34), the amino acid sequence of the complementarity determining region 2 of the light chain having amino acid sequence is VNNNRPP (Seq ID No. 35) and the amino acid sequence of the complementarity determining region 3 of the light chain is ALWYSNHWV (Seq ID No. 36) and the corresponding amino acid sequence of the complementarity determining region 1 of the heavy chain is DYNMY (Seq ID No: 61), the amino acid sequence of the complementarity determining region 2 of the heavy chain is YIDPHNGGIFYNQKFKG (Seq ID No: 62) and the amino acid sequence of the complementarity determining region 3 of the heavy chain is GGGLFAY (Seq ID No: 63).
- 10 25. The polypeptide of claim 24, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:2 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 15.
- 15 26. The polypeptide of claim 21, wherein the amino acid sequence of the complementarity determining region 1 of the light chain is RSSTGTITTSNYAN (Seq ID No. 31), the amino acid sequence of the complementarity determining region 2 of the light chain is INNNRPP (Seq ID No. 32) and the amino acid sequence of the complementarity determining region 3 of the light chain is ALWYSNHWV (Seq ID No. 33) and the corresponding amino acid sequence of the complementarity determining region 1 of the heavy chain is DYNMY (Seq ID No: 58), the amino acid sequence of the complementarity determining region
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2 is YIDPSNGGIFYNQKFKG (Seq ID No: 59) and the amino acid sequence of the complementarity determining region 3 is GGGLFAY (Seq ID No: 60).

5      27. The polypeptide of claim 26, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:1 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 14.

10      28. A polypeptide comprising a light chain domain with complementarity determining region 1 having amino acid sequence RSSSGTITANNYGS (Seq ID No: 40), complementarity determining region 2 having amino acid sequence VSNNRGP (Seq ID No: 41),  
15      complementarity determining region 3 having amino acid sequence ALWNSNHFV (Seq ID No: 42), interposed between appropriate framework regions, said light chain domain being linked to heavy chain domain with complementarity determining region 1 having amino acid sequence TYYIY (Seq ID No: 67), complementarity determining region 2 having amino acid sequence GMNPGNGVTYFNEKFKN (Seq ID No: 68) and complementarity determining region 3 having amino acid sequence VGRLFAY (Seq ID No: 69) interposed  
20      between appropriate framework regions such that the polypeptide assumes a conformation suitable for degrading cocaine.

25      29. The polypeptide of claim 28, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:4 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 18.

30      30. A polypeptide comprising a light chain domain with complementarity determining region 1 having amino  
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acid sequence RSSXSLLYXDGKTYLN (Seq ID No: 79), complementarity determining region 2 having amino acid sequence LMSTRXS (Seq ID No: 80) and complementarity determining region 3 having amino acid sequence QXFXXYPFT (Seq ID No: 81), interposed between appropriate framework regions, said light chain domain being linked to a heavy chain domain with complementarity determining region 1 having amino acid sequence SDYAWX (Seq ID No: 82), complementarity determining region 2 having amino acid sequence YIRXXXXTRYNPSLXS (Seq ID No: 83) and complementarity determining region 3 having amino acid sequence XHYYGXXX (Seq ID No: 84) interposed between appropriate framework regions such that the polypeptide assumes a conformation suitable for degrading cocaine.

31. The polypeptide of claim 30, wherein the amino acid sequence of the complementarity determining region 1 of the light chain is RSSRSLLYRDGKTYLN (Seq ID No. 19), the amino acid sequence of the complementarity determining region 2 of the light chain is LMSTRSS (Seq ID No. 20) and the amino acid sequence of the complementarity determining region 3 of the light chain is QHFVDYPFT (Seq ID No. 21) and the corresponding amino acid sequence of the complementarity determining region 1 of the heavy chain is SDYAWT (Seq ID No: 46), the amino acid sequence of the complementarity determining region 2 of the heavy chain is YIRHIYGTRYNPSLIS (Seq ID No: 47) and the amino acid sequence of the complementarity determining region 3 of the heavy chain is YHYYGSAAY (Seq ID No: 48).

32. The polypeptide of claim 31, wherein the light chain comprises the amino acid sequence as set

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forth in Seq ID No:5 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 10.

- 5 33. The polypeptide of claim 30, wherein the amino acid sequence of the complementarity determining region 1 of the light chain is RSSKSLLYEDGKTYLN (Seq ID No. 22), the amino acid sequence of the complementarity determining region 2 of the light chain is LMSTRAS (Seq ID No. 23), the amino acid sequence of the complementarity determining region 3 of the light chain is QHFEDYPFT (Seq ID No. 24) and the corresponding amino acid of the complementarity determining region 1 of the heavy chain is SDYAWT (Seq ID No: 46), the amino acid sequence of the complementarity determining region 2 of the heavy chain is YIRHIYGTRYNPSLIS (Seq ID No: 47) and the amino acid sequence of the complementarity determining region 3 of the heavy chain is YHYGSA (Seq ID No: 48).
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- 25 34. The polypeptide of claim 33, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:6 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 11.
- 30 35. The polypeptide of claim 30, wherein the amino acid of the complementarity determining region 1 of the light chain is RSSKSLLYEDGKTYLN (Seq ID No. 25), the amino acid sequence of the complementarity determining region 2 of the light chain is LMSTRAS (Seq ID No. 26), and the amino acid sequence of the complementarity determining region 3 of the light chain is QQFVEYPFT (Seq ID No. 27) and the corresponding amino acid of the complementarity determining region 1 of the heavy chain is SDYAWN (Seq ID No: 52), the amino acid sequence of the
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complementarity determining region 2 of the heavy chain is YIRYSGITRYNPSLKS (Seq ID No: 53) and the amino acid sequence of the complementarity determining region 3 of the heavy chain is IHYYGYGN (Seq ID No: 54).

36. The polypeptide of claim 35, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:8 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 13.
37. The polypeptide of claim 30, wherein the amino acid sequence of the complementarity determining region 1 of the light chain is RSSRSLLYRDGKTYLN (Seq ID No. 28), the amino acid sequence of the complementarity determining region 2 of the light chain is LMSTRAS (Seq ID No. 29), the amino acid sequence of the complementarity determining region 3 of the light chain QHFEDYPFT (Seq ID No. 30) and the corresponding amino acid sequence of the complementarity determining region 1 of the heavy chain is SDYAWT (Seq ID No: 55), the amino acid sequence of the complementarity determining region 2 of the heavy chain is YIRHIYGTRYNPSLIS (Seq ID No: 56) and the amino acid sequence of the complementarity determining region 3 of the heavy chain is YHYYGSAY (Seq ID No: 57).
38. The polypeptide of claim 37, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:7 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 12.
39. A polypeptide comprising a light chain domain with complementarity determining region 1 having amino acid sequence KSSQSLLYSDGKTYLN (Seq ID No: 43), complementarity determining region 2 having amino

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acid sequence LVSKLDS (Seq ID No: 44) and complementarity determining region 3 having amino acid sequence VQGYTFPLT (Seq ID No: 45), interposed between appropriate framework regions, said light chain domain being linked to heavy chain domain with complementarity determining region 1 having amino acid sequence DHWMH (Seq ID No: 72), complementarity determining region 2 having amino acid sequence TIDLSDTYTGYNQNFKG (Seq ID No: 71) and complementarity determining region 3 having amino acid sequence RGFYD (Seq ID No: 72) interposed between appropriate framework regions such that the polypeptide assumes a conformation suitable for degrading cocaine.

40. The polypeptide of claim 39, wherein the light chain comprises the amino acid sequence as set forth in Seq ID No:9 and the heavy chain comprises the amino acid sequence as set forth in Seq ID No: 17.

41. A DNA encoding the catalytic antibody of any one of claim 1-20.

42. A DNA encoding the polypeptide of any one of claim 21-40.

43. A humanized catalytic antibody of any one of claim 1-20.

44. A humanized catalytic single chain antibody of any one of claim 21-40.

45. A pharmaceutical composition for decreasing the concentration of cocaine in a subject which comprises an amount of antibody of any one of claim 1-40 effective to degrade cocaine in the subject and a pharmaceutically acceptable carrier.

46. A method of decreasing the concentration of cocaine in a subject which comprises administering to the subject an amount of an antibody of any one of claim 1-40 effective to degrade cocaine in the subject.

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47. A pharmaceutical composition for treating cocaine overdose in a subject which comprises an amount of antibody of any one of claim 1-40 effective to degrade cocaine in the subject and a pharmaceutical acceptable carrier.

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48. A method for treating cocaine overdose in a subject which comprises administering to the subject an amount of antibody of any one of claim 1-40 effective to degrade cocaine in a subject and reduce cocaine overdose in the subject.

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